Contamination: Definition; Public Health Context; And Its Widespread Usage by Claimants' Experts

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I. Introduction

The purpose of this paper is to present a public health perspective on the inappropriate and misleading use of the concept of contamination in the context of asbestos in building surface dust.

A paper titled "A Brief History of U.S. Concern for the Asbestos Inhalation Risk to Occupants and Maintenance Workers In Buildings With Asbestos-Containing Materials" by M. Corn has been submitted for use in the Court's Lack of Hazard Hearing. An October 14, 2005 paper titled "Settled Dust: What Is It and Is It Relevant to Assessment of Asbestos Inhalation Risk" by M. Corn (and the January 18, 2006 supplement thereto) were submitted for consideration in the cancelled Hearing on Settled Dust Methodologies, and are incorporated herein. In reading Claimants' Expert Reports for the current Hearing, and Plaintiffs' Expert Testimony in previous asbestos in buildings cases, I was struck by the emphasis placed on the words "contamination," "contaminant" and "contaminated." An example of statements encountered was "free respirable fibers are released from in-place asbestos.....and those fibers contaminate surfaces in the general vicinity of the in-place material" (W.E. Longo Report dated 10/25/06, p. 4). In Claimants' Expert Reports for the Lack of Hazard Hearing, samples of settled dust were collected on door ledges, above light fixtures, on elevated pipe surfaces and other locations that would not be in the breathing zones of occupants or maintenance personnel. The Claimants' assessments of asbestos fibers in the settled dust were performed as a basis for the claim that the surfaces are "contaminated," and that this contamination is a hazard to those in the building due to the potential for fiber re-entrainment. The issue of re-entrainment of fibers in settled dust has been addressed in the settled dust paper I wrote.

II. Definition of "Contamination"

Contamination is the "act or process of contaminating, or state of being contaminated." A "contaminate (or contaminant) is an impurity" (Webster's New International Dictionary of the English Language, W.A. Neilson, Editor in Chief., G.C. Merriam Company, Springfield, MA 1961). In this sense, all materials present in settled dust are contaminants, since the clean surface is "pure." The settled dust, regardless of source, i.e. wind-blown minerals, clothing, combustion products, carpet fibers, etc., are contaminants. All surface dust is "contaminated" with a variety of solid particles and perhaps liquid drops or films. Thus, the process of settled dust accumulation in a building (or a home) is a natural, to-be-expected process.

III. Widespread Usage of "Contamination"

An incomplete search of websites revealed a multiplicity of usages of the term "contaminated." Examples are:

1. Food contaminants:
    - Trichinellossis

- Shigellosis
- Vibrio Parahaermolytius
- Vibrio Vulnifirus
- Camphlobacteria
- Parasites-round worm
- Botulism

2. Groundwater
   - Gasoline
   - Septic systems
   - Mercury
   - Heavy Metals
   - MTBE

3. Soils
   - Lead
   - Mercury
   - Hazardous waste site chemicals

4. Radioactivity
   - Surfaces (expressed as pico Curies per square centimeter)

The list is by no means complete. Three peer reviewed journals were located that address the issues.

- Soil and Sediment Contamination
- Contamination Control Technology (for Clean Rooms)
- Archives of Environmental Contamination and Toxicology

Clearly, the word contamination is widely utilized.

IV. The Public Health Context of Contamination

When used in the public health context, contamination is a highly emotional word. For example, food contamination denotes that one can be harmed by ingesting the food. It could contain any one of many potentially harmful bacteria, perhaps the most feared being that causing botulism.

"Contaminated" is thus used in public health in those circumstances where harm or disease is associated with the presence of unwanted materials and their introduction into the human body. Food contamination can be associated with acute (botulism) or chronic (mercury in swordfish) adverse health effects. The characterization of a food as contaminated relies on the demonstrated presence of sufficient quantities of the contaminant, documentation of the pathway to cause the adverse effect and evidence of the effect in humans. There is a concentration of the "agent" specified, above which the

term "contaminated" will be used. For example, drinking water contains many trace materials. It is only when a guideline for the acceptable presence of a material is exceeded that the water is designated contaminated.

Another example is that of public swimming water, where the potential contaminant is E. Coli bacteria, associated with human waste. There are standards for acceptable E. Coli concentrations in swimming water. "Contaminated" swimming water exists only when the standard is exceeded, because only then is it deemed a public health hazard to swim in the water.

There are many other examples to illustrate the manner in which public health officials utilize the word "contaminated" as a basis for taking governmental action to alert the public to a hazard.

Perusal of public health, toxicology and industrial hygiene textbooks revealed infrequent or no use of the term "contamination." The above two areas, food and swimming water, and radioactivity were the major addressed subject areas. Apparently, the terminology began to be used more frequently with the passage of Federal regulation addressing hazardous waste sites ("Superfund"), and the publication of the initial guide books by the Environmental Protection Agency (EPA) for asbestos containing materials in schools.* The first, the "orange" book, used the term nine times. Subsequent guidance documents also utilized the term. Instead of phrasing the "orange" book question "why is asbestos a unique environmental trace material?" the question is phrased "why is asbestos a unique environmental contaminant?" It is important to note that, unlike in public health usage of the term, the EPA did not offer guidelines for the amount of asbestos in settled dust that would constitute a hazard. The terminology "contamination" was adopted by the EPA in the absence of scientific evidence that asbestos typically found on building surfaces constitutes a real hazard to building occupants and workers. Rather, the EPA indicated that fibers in settled dust can be re-suspended in the air, implying a hazard is associated with any amount of asbestos in settled dust. In the public health context, a hazard would not exist until the airborne concentration of asbestos exceeded a guideline or standard for inhalable airborne asbestos. A permissible concentration guideline for settled dust would be that concentration that has been scientifically associated with the exceedance of the airborne guideline or standard.

Because re-entrainment of settled asbestos fibers in buildings has never been demonstrated to exceed an airborne standard for inhalable asbestos, the term "contaminated" building based on settled dust analyses is not consistent with the public health usage of the word.

V. The Use or the Word "Contamination" by Claimants' Experts in Lack of Hazard Expert Reports

From the above discussion, it can be concluded that:

*Four guidance documents were published by EPA between 1979 and 1990. They are often referred to as the "rainbow books." (due to their orange, purple, blue and green covers)

- All ingredients of settled dust are "contaminants;" strictly speaking.

- "Contamination," as used in public health, denotes a hazard to the population at potential risk. In the paper I wrote on settled dust,* the point was made that standards for asbestos in settled dust do not exist. Also, a relationship does not exist between the concentration of airborne inhalable asbestos fiber and asbestos fibers in settled dust. As a corollary to this, guidelines for the numbers of asbestos fibers on surfaces do not exist.

- Re-entrainment of inhalable asbestos fibers in settled dust is difficult to achieve and this can be scientifically explained on the basis of particle adhesion to surfaces and fluid dynamics.

  Furthermore, the sources of asbestos fibers on building surfaces have never been subject to a material balance, e.g. quantitating how many fibers come from each of the possible sources. Outdoor air, short-term releases from intruding on ACM, demolition of buildings with ACM, windblown asbestos fibers from surface deposits and mining, building maintenance activities and tracking in on footwear probably contribute to different extents, depending on building location.

  Because of the public health tradition to use the word "contamination" in warnings where a real hazard exists, use of "contamination" for asbestos in settled dust in buildings indicates that occupancy of the building is a hazard to occupants. This is clearly incorrect. Continued designation of buildings with asbestos in surface dust as "contaminated" engenders deep concern in occupants because it evokes the conditioned public health response of concern and possibly fear. It draws on the public's understanding of the term in the public health context. It is misleading and inappropriate because scientific investigation has not demonstrated that significant quantities of inhalable asbestos fibers from surface dust are present in building air, or that anyone has been, or is likely to be made sick from asbestos in building surface dust.

*M. Corn. Settled Dust: What is it and Is It Relevant to Assessment of Asbestos Inhalation Risk? Submitted October 14, 2005 for the then scheduled Hearing on settled dust.